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ABSTRACT

The purpose of this study was to examine the academic and social growth of first grade pupils whose teachers received one of the following sources of assistance: (1) information regarding pupil performance on academic and social measures early in the school year, (2) student volunteers who assisted the teacher on a regular basis, and (3) both test information and student volunteers. A sample of 727 first grade students in 30 classrooms participated in the study, conducted by the North York, Ontario, Board of Education. Of these, 111 were identified as likely to experience limited school success. Three treatment groups were established, corresponding to the three categories above, with student volunteers from York University pre-education and educational psychology programs. Participating first grade classes were tested early in the fall, with post-testing conducted late in the spring. Test instruments were: Metropolitan Achievement Test primer reading and numbers subtests and a primary self concept inventory developed by the North York Board of Education. Although results indicated no significant differences between the three treatment groups, there was definite variability between classes within each group. It was concluded that an intervention program produces greater than expected academic and self concept growth, supporting earlier findings from studies of similar programs in North York schools. (BF)

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AN EXAMINATION OF THREE INTERVENTION STRATEGIES WITH PRIMARY CHILDREN

Hannah Math

Albert Virgin

July, 1975

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Statement of the Problem

The purpose of the study was to examine the academic and social growth of Grade 1 pupils whose teachers received one of the following sources of assistance:

(i) information regarding pupil performance on academic and social measures early in the school year.

(ii) student volunteers who assisted the teacher on a regular basis.

(iii) both test information and student volunteers.

Review of Literature

"The child who has difficulty in learning almost without exception faces failure in a conventional school program. Often he experiences months and sometimes years of unsuccessful work before he receives remedial aid. This failure, resulting from the inability to develop potential capacities, can only lead to compounded and more serious problems when the school program demands, through its presentation of academic material, that the child use skills which he has never developed, or tries to build on experiences that the child has never had, or requires the utilization of a concept yet unestablished". (Haring & Ridgway, 1967, p. 387).

Consequently, the early identification of children who seem likely to experience limited success in school is considered an important goal by both educators and parents.

Considerable work has been done to find measures of child characteristics within the school setting which would provide a solid basis for the prediction of school success or failure. For example, a variety of screening and readiness tests have been developed to assess facets of children's development assumed to be related to later school achievement, namely, dimensions of language, cognitive, sensory, perceptual and physical motor behaviour, (de Hirsch, Jansky & Langford, 1966; Ilg & Ames, 1964; Sprigle and Lanier, 1967; Slingerland, 1964). These researchers, however, have demonstrated few clear one to one relationships between specific characteristics of the young child and specific school learnings.

Keogh and Becker (1973) suggest that the sole use of standardized test batteries for identification is limited, as this approach does not include important evaluative information regarding the child's behaviour in the classroom. Their position has been supported by the findings of a number of studies. Cobb (1972) found a consistent relationship between performance on achievement tests and such behaviours as attending to the teacher, following teacher instructions and volunteering to answer academic questions. Cobb calls these behaviours "academic survival skills" and feels that they are necessary, although not sufficient, for successful academic functioning.

Conrad and Tobiessen (1967) have defined 13 behavioural dimensions similar to those of Cobb, e.g. waiting and sharing, use of materials, level of organization of play, which they have found useful for screening kindergarten children. Attwell, Orpet and Meyers (1967) found that behaviours assessed with their Test Observation Guide were highly related to learning problems in school. These studies have all indicated that systematic observation of children's behaviour in the classroom has provided useful data for early identification of educationally high risk children. One additional important point to emphasize is that the classroom teacher was often the major source of behavioural data in these studies.

Ebbesen (1968) found significant correlations between kindergarten teachers' ranking of their pupils' predicted achievement in the primary grades and the pupils' achievement as measured by the Metropolitan Achievement Test in Grades 1 and 2. Ebbesen concluded that it is reasonable to assume that a kindergarten teacher has a unique opportunity to observe and work with her children in school and in view of the results of the study did know and understand the children very well.

Ferinden & Jacobson (1970) asked kindergarten teachers to choose those pupils whom they believed to be high risk in the probability of developing learning problems at the first-grade level. The entire population was tested after a four month exposure to the Grade 1 curriculum, using the Wide Range Achievement Test, the Evanston Early Identification Scale, the Bender Gestalt Visual Motor Test and the Metropolitan Reading Readiness Test. The results showed that "experienced kindergarten teachers can select with extreme accuracy, those children who will experience difficulty at the first - grade level... the teacher-referred group was below the reading readiness level of the non-referred group on all four test instruments". (p.49). "The teachers were 80 percent effective in predicting potential learning problems at the kindergarten level, employing subjective judgment alone." (p. 49).

Keogh and Smith (1970) found consistently significant correlations between kindergarten teachers' ratings and pupils subsequent academic achievement in Grades 2 - 5. Kindergarten teachers rated pupils on a five-point scale of reading readiness, where a rating of one denoted total lack of reading abilities and five indicated the pupil was now ready to begin reading. Teachers were not provided with specific criteria on which to evaluate readiness. Eighteen or 90 percent of the identified pupils obtained achievement scores in the predicted directions. "Accuracy of prediction for such a large proportion of children in the sample suggests that teachers recognized developmental and behavioural characteristics important in school performance". (Keogh & Smith, 1970, p. 288).

The results of these studies would indicate that schools can make predictions of pupils' future academic success with a relatively high degree of accuracy. In view of these findings, the next question is, What can schools do to improve the chances of school success for pupils identified as in need of help?

Background of the Present Study

In 1972 - 73, North York initiated an experimental intervention program in 16 Grade 1 classrooms (Fram, Cassidy & Virgin, 1973). Pupils who were hypothesized as likely to experience limited school success were identified by means of (a) kindergarten teacher ratings, (b) their performance on the reading and numbers subtests of the Metropolitan Achievement Test, and (c) a self concept inventory. The test results for the total class plus a list of those pupils who could benefit from additional help were fed back to the Grade 1 teacher.

To assist the teacher in providing assistance for these pupils, volunteers were recruited. A number of studies, particularly in connection with Head Start programs (Willmon, 1969; Weikart, 1969), testify to the effectiveness of parent-involvement in the school setting. A study by Floyd Robinson and David Brison of The Ontario Institute for Studies in Education, Niagara Region has resulted in the publishing of a booklet entitled "Volunteer Helpers in Elementary Schools" which outlines in some detail the kinds of help parents and other volunteers can give in the school and makes concrete suggestions for the most efficient use of volunteer help. In North York, university students, Teachers' College students and Grade 6 pupils were used as volunteers in addition to parents. Each teacher, with the assistance of the Principal, organized her own program. Consequently, volunteers were used in a variety of ways. In some classes, volunteers worked with identified children on a one-to-one basis, while in others, the volunteer carried out activities with the majority of the class while the teacher worked with the identified pupils. Volunteers assisted the teacher by engaging in activities such as listening or reading stories, phonics, word games, physical education and group discussion.

Post-testing on the achievement and self concept tests occurred in May and gain scores were calculated for both identified and non-identified pupils to determine the extent of growth. The identified pupils showed greater than expected gains on both numbers and self concept and met the expectation on the reading subtest. The non-identified pupils made greater than expected gains on self concept and reading.

These results were made available to all elementary principals throughout the Borough early in September, 1973 and as a consequence 73 elementary schools elected to participate in the Intervention Program during the 1973 - 74 school year. Approximately 4,000 Grade 1 children were tested in the fall using the M.A T. Reading and Numbers subtests and a Self Concept Inventory. In addition, the kindergarten teachers were asked to rate these pupils on a five point scale in terms of:

1. Pupils' expected achievement in Grade 1.
2. Likelihood of the pupil experiencing social difficulties in Grade 1.

To be identified, a pupil had to meet the following criteria:

1. one standard deviation or more below his class mean on two of three measures of achievement, i.e. M.A.T. Reading, M.A.T. Numbers and Teacher Rating of achievement,

and

2. one standard deviation or more below his class mean on one of the two social measures, i.e. Self Concept Inventory and Teacher Rating of social difficulties.

Using these criteria, 595 pupils were identified as likely to benefit from additional assistance. The results for each class plus a list of identified pupils indicating their areas of weakness were fed back to the Grade 1 teachers during October/November. As in the pilot study, volunteers, i.e. parents, university students, community college students and Grade 6 pupils assisted the teachers in the classroom. Post-testing occurred in April 1974 and gain scores were calculated for both identified and non-identified pupils.

Identified pupils made greater than expected gains on the three measures, while their classmates maintained their relatively high average Self Concept scores and grew at the expected rates on reading and numbers (Crawford & Virgin, 1974).

In 1974, the North York Board submitted a proposal to the Ministry of Education to conduct an in-depth study of the relative academic and social growth of Grade 1 pupils whose teachers received one of the following sources of assistance: (i) information regarding pupils' performance on academic and social measures early in the school year (ii) student volunteers to assist the teachers on a regular basis (iii) both test information and student volunteers.

The proposal was approved and the following is the report of the Ministry Intervention Study which consists of a detailed description of the research study itself and the analysis of the data collected.

Sample

727 Grade 1 students in 30 classrooms participated in the study, of which 111 (15%) were identified as likely to experience limited success in school.

Treatment Group Procedures

1. Information Only

The teachers in this treatment group were given information from the September pre-test scores regarding the performance of their class as well as a list of identified and borderline children. These teachers were not given volunteer assistance but were encouraged to alter their teaching strategies, resources and time in order to provide assistance to identified children.

2. Volunteers Only

The teachers in this condition were given volunteers from the York University Pre-Education Program and an Educational Psychology course but were not given the results of the pre-test. Each teacher was assigned volunteers for at least 4 half days a week. No specific instructions were issued about the ways in which volunteers were to be used, however, an Intervention Handbook, with suggested activities for volunteers, was distributed to the teachers as a guide to practice. The nature of volunteer activities in the classroom was left to the discretion of the classroom teachers.

3. Both Volunteers and Test Information

These teachers received both pre-test information on their pupils' performance and volunteers from York University for at least 4 half days per week. Here again no specific directives were given to the teacher, as to the ways in which they were to employ volunteers in the classroom. Such matters were left to the teachers, although the Intervention Handbook was also given to these teachers to give some ideas about volunteer activities.

Recruitment of Volunteers

During the month of September, several members of Research Services attended a meeting of pre-education students at York University to recruit volunteers for the study. Only three-quarters of the students required (80) volunteered to take part in the study. It was therefore necessary to approach two educational psychology classes at York to obtain the remainder of the volunteers. By the end of the first week in October, all volunteers had been recruited and were working in their assigned classrooms.

Testing

During a two week period at the end of September, the following three tests were administered to each of the Grade 1 classes participating in the study.

1. Reading Subtest, Metropolitan Achievement Test (M.A.T.) Primer, Form F.
2. Numbers Subtest, M.A.T. Primer Form F.
3. Primary Self Concept Inventory, developed by Research Services, North York Board of Education.

In each class, two testing sessions were carried out on two separate, and in most cases consecutive days. During the first testing session, the Primary Self Concept Inventory and the M.A.T. reading subtest were administered in that order. The Self Concept Inventory was administered first to eliminate the possible problems that might arise with students who experienced difficulty on the reading test. The M.A.T. numbers subtest was administered during the second testing session.

The testing was carried out by five per diem staff, all of whom were either primary school teachers or had had experience in administering tests at the primary level. Prior to the testing, all testers were given an orientation session in which they were briefed on how to administer and score the tests. Once the testing was completed, the testers scored and checked all test booklets at Research Services.

In addition to the above-mentioned measures, kindergarten teacher ratings were available from the previous spring. The kindergarten teachers had rated their pupils on a five point scale on two dimensions:

1. Pupils expected achievement in Grade 1.
2. Likelihood of the pupil experiencing social difficulties in Grade 1.

Thus, five pieces of data were available for each student, three academic measures (M.A.T. Numbers, M.A.T. Reading and Kindergarten Teacher Rating on Achievement) and two social measures (Primary Self Concept and the Kindergarten Teacher Rating/Social Behavior).

A pupil was identified as likely to experience some difficulty in school if his scores were:

(i) one standard deviation or more below his class average on 2 of the 3 achievement measures, i.e. M.A.T. reading, M.A.T. numbers and K-Teacher Rating Achievement.

and

(ii) one standard deviation or more below his class mean on 1 of the 2 social measures, i.e.Self Concept Inventory and Kindergarten-Teacher Rating on Social Difficulties.

If a pupil did not meet the above criteria, but was low on at least two of the measures, he was considered as borderline. Using this procedure 111 or 15% of the 727 pupils were selected.

Approximately a week and a half after pre-testing, each teacher in treatment groups 1 (Info. only) and 3 (Information and Volunteers) received a report of the pre-test results which included:

1. A list of the pupils in the class with their scores on each of the five measures.
2. The class average on each of the three test scores.
3. A list of the identified and borderline pupils in the class and some indication of the measures on which they were identified.

Post-testing occurred during the second week in April. Pupils were again asked to complete the M.A.T. Reading, M.A.T. Numbers and Primary Self Concept Inventory.

Whereas in the fall only the first and third treatment groups received feedback from the pre-test, a feedback report was delivered, in the spring to all teachers in the study and included:

1. Pre-test scores on all measures for each pupil.
2. Post-test scores on all measures for each pupil.
3. Gain scores, i.e. a measure of the extent of growth from fall to spring on each measure for each pupil.
4. Class average on each measure, plus the average gain score on each measure.

RESULTS

Observational Results

The purpose of the observation of volunteers was (1) to describe the kinds of activities in which they were involved and (2) to determine which children (identified or non-identified either by the teachers or tests) the volunteers worked with.

The following information was obtained as a result of three visits to each classroom in which volunteers were employed (conditions 2 and 3). Although each visit was arranged when a volunteer was scheduled to be in the classroom, there were a few cases when the volunteers were absent due to sickness or other reasons.

1. Volunteers Only (Condition #2)

   The classrooms in this condition had a preponderance of volunteers who worked with the class in general and who attended to immediate problems which arose while the class was doing an assigned task.

   Other classroom teachers had a specific plan of how the volunteer was to spend his/her time. On these instances, drill exercises and games were prepared for certain children in need of extra attention, and volunteers worked on a one to one basis with such children in a location (library, staff room, etc.) outside the class. Another type of one to one interaction was that in which volunteers either chose or were assigned to work on a regular weekly basis with a child who was so far behind that he/she needed someone to work closely with him while doing regular exercises.

   In a few classrooms, the teachers worked with groups of identified children, while the general supervision of the rest of the children working on assigned tasks was left to the volunteer.

2. Both Volunteers and Test Information

   Inspite of the fact that in this condition teachers possessed information concerning which pupils were identified, the volunteers tended to assist all children in the

classes on assigned tasks. In many cases volunteers worked outside the classroom with a group of non-identified pupils either listening to reading, enriching the content of a process already mastered or re-enforcing specific skills previously taught by the classroom teacher.

In only a few instances were volunteers allocated to work specifically with identified children, either on an individual or group basis. When in fact this happened, the pupils were usually removed from the classroom where the volunteers drilled the children on phonics or carried out other tasks which were prepared by the teacher beforehand.

Achievement and Self Concept Results

Mean scores were calculated on each measure for both identified and non-identified pupils in each of the three treatment groups. The data for identified and non-identified pupils are discussed separately in the two sections which follow.

Identified Pupils

Average standard scores obtained by the identified pupils on the reading subtest are shown in Table 1.

TABLE 1

AVERAGE STANDARD SCORES AND CORRESPONDING GAINS ON THE READING SUBTEST FOR IDENTIFIED PUPILS

		TREATMENT GROUP		
		1 Info. Only	2 Volunteers Only	3 Info. & Volunteers
PRE-TEST	Average Score	22.4	22.0	22.4
	Standard Deviation	4.0	4.0	5.3
	Number of Pupils	35	33	41
POST-TEST	Average Score	32.1	31.1	32.6
	Standard Deviation	6.0	5.1	5.7
	Number of Pupils	35	32	41
ACTUAL GAIN	Average Score	9.7	9.2	10.2
	Standard Deviation	7.0	5.4	6.3
	Number of Pupils	35	31	40
EXPECTED GAIN		7.0	7.0	7.0

As a one-way analysis of variance indicated that there were no significant differences among the three groups in the pre-test, a one-way analysis of variance was conducted on the gain scores. The results of this analysis also indicated that there were no significant differences between the three treatment groups in terms of the gains made in reading.

It should be noted that for each group the actual gain far exceeded the expected gain. The probability that these differences between actual and expected gains are a result of chance is less than one in twenty. This means that on the average, pupils were able to complete between 15 - 17 more reading items on the post-test than on the pre-test.

Average standard scores obtained by identified pupils on the numbers subtest are shown in Table 2.

TABLE 2

AVERAGE STANDARD SCORES AND CORRESPONDING GAINS ON THE NUMBERS SUBTEST FOR IDENTIFIED PUPILS

		TREATMENT GROUP		
		1 Info. Only	2 Volunteers Only	3 Info. & Volunteers
PRE-TEST	Average Score	18.5	21.4	19.9
	Standard Deviation	5.5	3.7	4.4
	Number of Pupils	35	33	43
POST-TEST	Average Score	32.4	31.4	35.0
	Standard Deviation	7.6	5.2	7.0
	Number of Pupils	35	34	43
ACTUAL GAIN	Average Score	13.9	10.6	15.1
	Standard Deviation	7.1	4.2	6.1
	Number of Pupils	35	33	43
EXPECTED GAIN		10	11	11

As there were significant differences among the three treatment groups in terms of their average pre-test scores on the numbers subtest, an analysis of covariance was conducted on the post-test scores using the pre-test as the covariate. The results of this analysis indicated that there were no statistically significant differences among the three treatment groups on the post-test.

Only two groups, Treatment 1 (Information only) and Treatment 3 (Information and Volunteers) exceeded the expected gain. The probability of the differences between expected and actual gains for these two groups occurring by chance are less than one in twenty. On the average, pupils in both Treatment Groups 1 & 3 obtained 15 more items correct on the post-test as compared with the pre-test. Pupils in Treatment 2 (Volunteers only) on the average met the expected gain, which represented 11 more items correct on the post-test as compared with the pre-test.

Average self concept scores for identified pupils in the three treatment groups are shown in Table 3.

TABLE 3

AVERAGE SELF CONCEPT SCORES AND CORRESPONDING GAINS FOR IDENTIFIED PUPILS

		TREATMENT GROUP		
		1 Info. Only	2 Volunteers Only	3 Info. & Volunteers
PRE-TEST	Average Score	25.9	26.2	25.6
	Standard Deviation	8.1	8.1	6.6
	Number of Pupils	35	33	41
POST-TEST	Average Score	31.4	31.6	31.7
	Standard Deviation	6.6	7.1	6.6
	Number of Pupils	35	31	41
GAINS	Average Score	5.5	5.8	6.4
	Standard Deviation	7.4	7.7	7.1
	Number of Pupils	35	30	40

There were no significant differences between the three treatments in terms of either pre-test scores or their gain scores. Although not significant, there is a slight tendency for Treatment Group 3 (Information and Volunteers) to have a higher gain than either of the other two groups, although all three groups made substantial gains from pre-test to post-test.

Non-Identified Pupils

Average standard scores obtained by the non-identified pupils on the Reading subtest are shown in Table 4.

TABLE 4

AVERAGE STANDARD SCORES AND CORRESPONDING GAINS ON THE READING SUBTEST FOR NON IDENTIFIED PUPILS

		TREATMENT GROUP		
		1 Info. Only	2 Volunteers Only	3 Info. & Volunteers
PRE-TEST	Average Score	27.6	27.3	29.2
	Standard Deviation	4.4	5.5	6.4
	Number of Pupils	169	175	153
POST-TEST	Average Score	36.8	36.4	38.0
	Standard Deviation	5.6	5.9	6.2
	Number of Pupils	166	174	151
GAINS	Average Score	9.2	9.2	9.0
	Standard Deviation	5.5	5.4	4.8
	Number of Pupils	165	172	149
EXPECTED GAIN		7.0	7.0	7.0

A one-way analysis of variance on the pre-test reading scores indicated that in September there were significant differences between the non-identified pupils in the three treatment groups ($F = 5.5$, $df = 2,496$, $p \leq .01$). Therefore an analysis of covariance was conducted on the post-test scores using the pre-test scores as the covariate. The results of this analysis indicated that there were no significant differences among the three groups in terms of their average scores on the reading test in April.

All three groups exceeded the expected gain, obtaining 13 - 15 more items correct on the average on the post-test than the pre-test.

Average standard scores for non-identified pupils in each of the treatment groups on the numbers subtest are shown in Table 5.

TABLE 5

AVERAGE STANDARD SCORES AND CORRESPONDING GAINS ON THE NUMBERS SUBTEST FOR NON-IDENTIFIED PUPILS

		TREATMENT GROUP		
		1 Info. Only	2 Volunteers Only	3 Info. & Volunteers
PRE-TEST	Average Score	27.3	27.3	28.7
	Standard Deviation	6.7	7.8	9.0
	Number of Pupils	162	174	150
POST-TEST	Average Score	40.6	42.9	45.5
	Standard Deviation	8.7	8.9	9.0
	Number of Pupils	162	175	150
ACTUAL GAINS	Average Score	13.5	15.4	16.9
	Standard Deviation	7.7	8.0	7.3
	Number of Pupils	156	172	145
EXPECTED GAIN		12	12	14

As there were no differences among the three groups on the pre-test, a one way analysis of variance was conducted on the gain scores. The results of this analysis indicated that there were significant differences among the three groups ($F = 7.6$, $df = 2,472$, $p < .01$) with the average gain for treatment 3 (Information and Volunteers) being higher than that for treatment 2 (volunteers only) which was in turn higher than that for treatment 1 (information only).

It should also be noted that the average gain for each treatment group is significantly higher than the expected gain. On the average, the non-identified pupils obtained 13 - 14 more items correct on the post-test than on the pre-test.

Average self concept scores for the non-identified pupils are shown in Table 6.

TABLE 6

AVERAGE SELF CONCEPT SCORES
FOR NON-IDENTIFIED PUPILS

		TREATMENT GROUP		
		1 Info. Only	2 Volunteers Only	3 Info. & Volunteers
PRE-TEST	Average Score	31.0	30.0	32.9
	Standard Deviation	5.9	6.6	5.2
	Number of Pupils	169	175	153
POST-TEST	Average Score	33.6	33.3	35.3
	Standard Deviation	7.5	5.7	5.4
	Number of Pupils	166	174	152
ACTUAL GAINS	Average Score	2.6	3.3	2.3
	Standard Deviation	7.8	7.3	6.8
	Number of Pupils	165	172	150

A one-way analysis of variance conducted on the pre-test scores indicated significant differences among the three groups ($F = 9.6$, $df = 2,496$, $p < .01$), therefore an analysis of covariance was conducted on the post-test scores using the pre-test scores as the covariate. The results of this analysis indicated that there were no differences among the three groups of non-identified pupils in terms of their average spring self concept scores.

Although the results indicated that for the most part there were no significant differences between the three treatment groups, there was variability between classes within each treatment group. One way analyses of variance were conducted for each measure to examine the differences between classes within each of the three treatments. Of the nine analyses conducted, significant differences were found in eight cases.

Conclusions

It is concluded from this study that an intervention program produces greater than expected academic and self concept growth. This supports earlier findings from studies of similar programs in other North York schools.

Observational and statistical analysis suggest that there is more variability in the average social and academic growth between the individual classrooms than can be explained by any one of the three treatments used in this study.

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